

# Sean Kafer

Georgia Institute of Technology, School of Mathematics  
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- EDUCATION**
- PhD in Combinatorics and Optimization*** August 2022  
**Supervisor:** Laura Sanità  
**Thesis title:** Polyhedral Diameters and Applications to Optimization  
University of Waterloo, Waterloo, Ontario
- Master of Mathematics: Combinatorics and Optimization*** August 2017  
**Supervisor:** Laura Sanità  
**Thesis title:** On The Circuit Diameters of Some Combinatorial Polytopes  
University of Waterloo, Waterloo, Ontario
- Bachelor of Science (Major: Mathematics)*** May 2015  
University at Buffalo, Buffalo, NY
- EMPLOYMENT HISTORY**
- Visiting Assistant Professor*** 2023-2025  
Georgia Tech, School of Mathematics
- Postdoctoral Fellow***  
Brown University, Institute for Computational and Experimental Research in Mathematics (ICERM)  
• *Discrete Optimization: Mathematics, Algorithms, and Computation semester program* Winter 2023
- Graduate Research Assistant*** 2015-2022  
University of Waterloo, Faculty of Mathematics  
• *Research in polyhedral diameters and linear optimization.*
- Teaching***  
University of Waterloo, Faculty of Mathematics  
• *CO 227: Introduction to Optimization (Non-Specialist Level)* Fall 2021
- Georgia Institute of Technology, School of Mathematics  
• *MATH 1554: Linear Algebra* Fall 2022  
• *MATH 1553: Introduction to Linear Algebra* Fall 2023
- Teaching Assistant***  
University of Waterloo, Faculty of Mathematics  
• *CO 250: Introduction to Optimization* eleven terms, 2015-2022  
• *CO 370: Deterministic OR Models* seven terms, 2016-2022  
• *CO 450/650: Combinatorial Optimization* one term, 2018  
• *CO 327: Deterministic OR Models (Non-Specialist Level)* one term, 2020
- Undergraduate Researcher*** 2013  
URGE to Compute: NSF CSUMS at Buffalo  
• I worked on a research team with two other undergraduates for one year, during which time we produced two publications on clique problems in intersection graphs of convex polygons.

## PUBLICATIONS & PREPRINTS

- A. Black, J. A. De Loera, **S. Kafer**, L. Sanità. *On the Simplex method for 0/1 polytopes*. Accepted to MOR. (arXiv:2111.14050).
- J. A. De Loera, **S. Kafer**, L. Sanità. *Pivot rules for circuit-augmentation algorithms in linear optimization*. SIOPT. 2022. (arXiv:1909.12863)
- **S. Kafer**, K. Pashkovich, L. Sanità. *On the circuit diameter of some combinatorial polytopes*. SIDMA. 2019. (arXiv:1709.09642)
- V. E. Brimkov, K. Junosza-Szaniawski, **S. Kafer**, J. Kratochvíl, M. Pergel, P. Rzażewski, M. Szczepankiewicz, J. Terhaar. *Homothetic polygons and beyond: Maximal cliques in intersection graphs*. Discrete Applied Mathematics. 2017. (arXiv:1411.2928)
- V. E. Brimkov, **S. Kafer**, M. Szczepankiewicz, J. Terhaar. *On intersection graphs of convex polygons*. Lecture Notes in Computer Science. 2014.
- V. E. Brimkov, **S. Kafer**, M. Szczepankiewicz, J. Terhaar. *Maximal cliques in intersection graphs of quasi-homothetic trapezoids*. Proc. MCURCSM. 2013.

## PRESENTATIONS **Invited Talks**

- *An Introduction to the Circuits of Polyhedra: Basics, Diameters, and Optimization*. Plenary talk at Circuit Diameters and Augmentation: Recent Advances in Linear and Integer Optimization. May 2023

## **Conferences and Workshops**

- *It's not hard to solve LPs quickly with circuits*. Presented at Circuit Diameters and Augmentation: Recent Advances in Linear and Integer Optimization. May 2023
- *Performance of Steepest Descent in 0/1 LPs*. Presented at Hausdorff workshop on tropical geometry and the geometry of linear programming. September 2021.
- *On intersection graphs of convex polygons*. Presented at IWCIA 2014. July 2014.
- *Maximal cliques in intersection graphs of quasi-homothetic trapezoids*. Presented at MCURCSM 2013. November 2013.

## **Seminars**

- *Generating Short Monotone Paths in 0/1 LPs*. Discrete Optimization: Mathematics, Algorithms, and Computation Seminar, ICERM. April 2023.
- *Generating Short Monotone Paths in 0/1 LPs: From Circuits to Simplex*. CombOpt Reading Group Seminar, University of Waterloo. April 2022.
- *An Introduction to the Circuits of Polyhedra, The Circuit Diameter, and Their Applications*. CombOpt Reading Group Seminar, University of Waterloo. February 2020.
- *The circuits of combinatorial polytopes: Diameter bounds and hardness of computation*. Mathematics of Data and Decisions at Davis Seminar, UC Davis. February 2019.

## AWARDS

### **University of Waterloo**

- Sinclair Graduate Scholarship (\$ 1 500) 2022
- William Tutte Postgraduate Scholarship (\$ 2 500) 2019 - 2020
- Sinclair Graduate Scholarship (\$ 2 100) 2019
- Math Faculty Award (\$ 1 000) 2018
- Math Faculty Award (\$ 5 000) 2017
- Math Graduate Experience Award (\$ 1 000) 2016

### **University at Buffalo**

- Presidential Scholarship (\$ 20 000) 2011-2014

**REFeree  
ACTIVITY**

- Integer Programming and Combinatorial Optimization (IPCO)
- SIAM Journal on Discrete Mathematics (SIDMA)
- Symposium on Discrete Algorithms (SODA)
- Mathematical Programming (MAPR)
- Operations Research Letters (ORL)
- Foundations of Software Technology and Theoretical Computer Science (FSTTCS)